LACNIC - 2023 Líderes Program

Digital Inclusion in the Guajajara Territory: Analysis of Connectivity and its Impact on the Guajanaíra Community

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1. Introduction

Communities in more isolated areas usually experience extremely poor Internet connections or even lack any form of connectivity. This occurs because these communities are typically far from urbanized areas, a scenario compounded by various factors such as the presence of rivers, rugged terrain, dense forests, etc. Together, these factors represent an obstacle for both infrastructure development and signal transmission, which leads to the digital isolation of these localities, often original peoples and indigenous communities.

To better understand the impact of Internet access, this study will be carried out with the Guajanaíra indigenous community, located in the southeast of the state of Pará. The study seeks to understand the true impact of connectivity and the availability of digital services on the daily lives of the members of this community. With the help of a questionnaire, the study will examine aspects such as the quality of the Internet available at the location, what the Internet is used for, and which devices are used to connect.

Overall, the study seeks to understand the profile of internet users in the community and their level of insertion into the network, as well as the infrastructure available for this purpose.

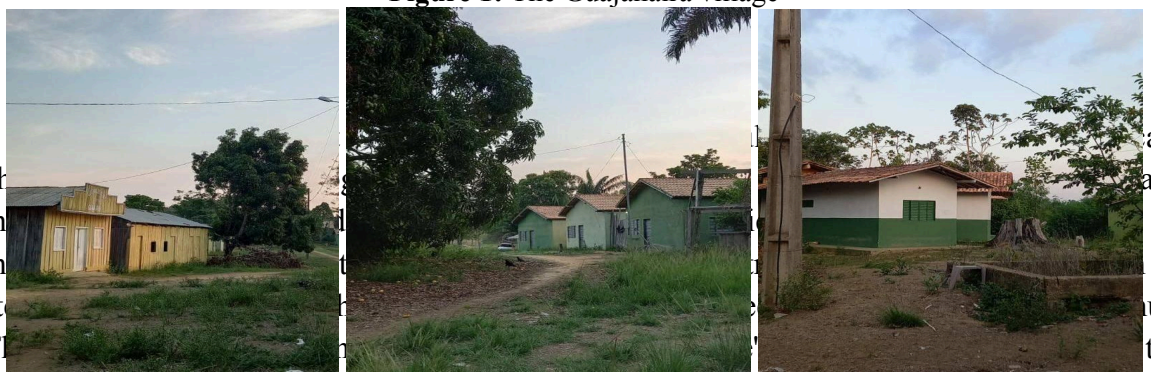
2. Methodology

2.1 Location

The Guajanaíra village is located in the southeast of the state of Pará, approximately 121 km from the municipality of Itupiranga. The community is of the Guajajara ethnicity and lives in the territory of the same name. Accessing this remote community involves a three-hour journey through a rural area and dirt roads. The population is small, currently comprised of 14 families and a total of 36 individuals including children, adults, and the elderly.

While some residents have a fixed income through employment at the local school and the village health center, others sustain themselves through fishing, hunting, agriculture, and government subsidies. No mobile network reaches the region, which means that any and all forms of connectivity are achieved via a Wi-Fi connection. All of the above underscores the distinctive challenges faced by the community with regard to connectivity and the use of the Internet.

Figure 1: The Guajanaíra village



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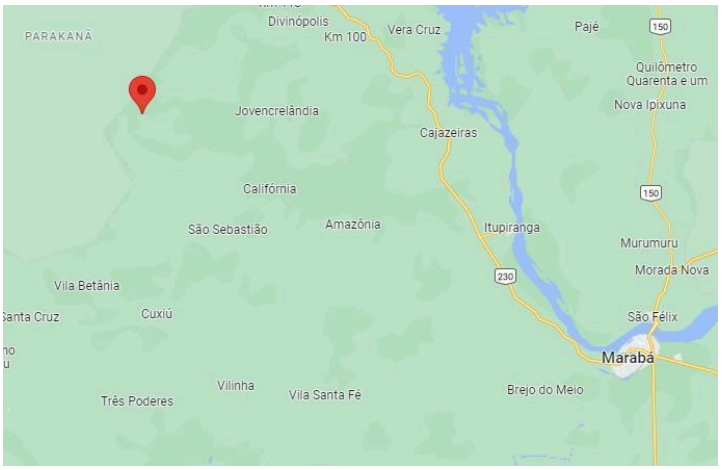
the importance of addressing infrastructure when discussing Internet connectivity and utilization in the region.

Figure 2: Village location



Source: The authors.

Originally, the plan was to conduct a field visit to observe the connectivity infrastructure and understand the community's social and economic context. However, given our unsuccessful attempt to reach the village, we conducted the analysis remotely using a form and working together with village members.

Figure 3: Attempt to visit the village

Source: The authors.

2.2 Data Collection

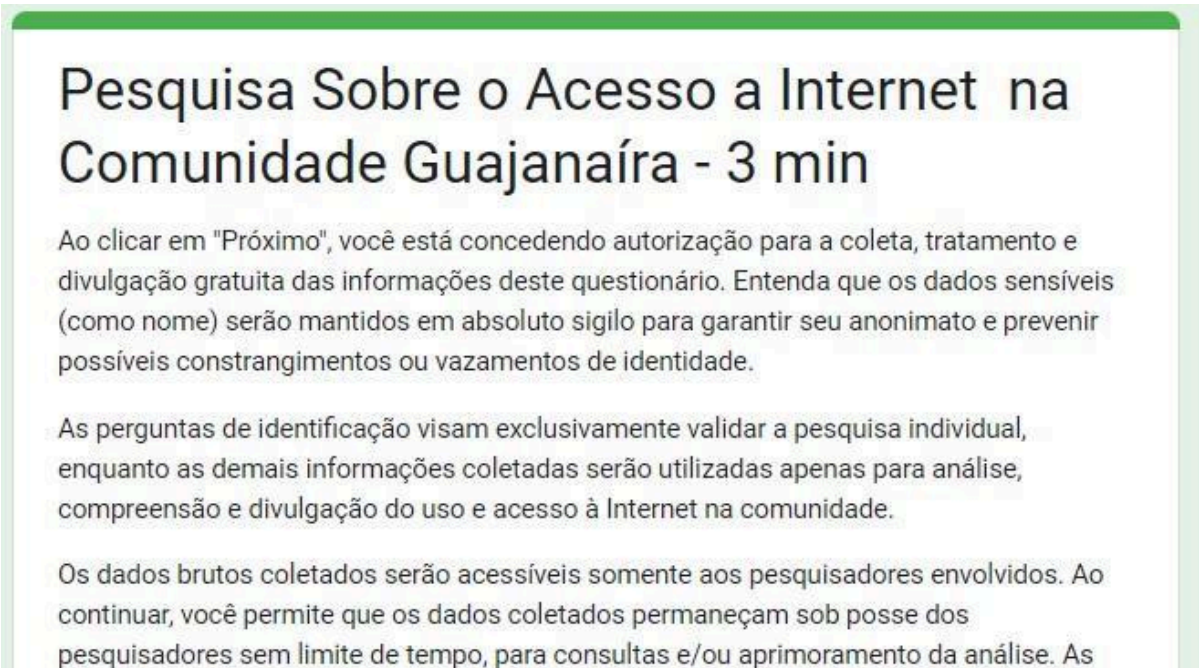
Once we established contact with the community, we inquired about the feasibility of conducting primary data collection through an online form. The residents showed enthusiasm and commitment to collaborating with the study, which led us to anticipate that we would reach a broad range of participants, thus expanding the representativeness of the results. However, we also considered the possibility that some members of the community might lose access to the questionnaire due to its online format.

The forms were created based on reference material used by the Brazilian Network Information Center (NIC.br) through SEBRAP for conducting research on community networks. The initial form is intended to be completed by the person responsible for implementing the network, and its purpose is to explore the technical aspects of the network, including information about the provider, capacity, connection methods, equipment, and other relevant information. Its purpose is to understand the creation, maintenance, and operation of the network.

The second form is intended to be completed by all residents aged 14 and above. The first part of this questionnaire seeks to gather general data about the participant, such as name, age, gender, education level, age group and Internet utilization. Subsequent questions will focus on the respondent's relationship with the local Internet, covering aspects such as connection quality, common issues, frequency of utilization, devices available for connecting to the Internet, etc.

It should be noted that, before granting access to the questions, the questionnaire initially requests authorization to collect, process, and disseminate the data free of charge, as can be seen in Figure 4.

Figure 4: Message for granting the right to use the data that appears at the beginning of the questionnaire.



Source: The authors.

3. Results

Given the difficulties in physically reaching the village, the questionnaire was administered completely online, and was made available during the first half of November 2023.

3.1 Aspects Related to the Network

Information about the connectivity available in the village was obtained using the first form and through contact with the residents. It was determined that people in the village connect in two different ways, the first of which involves contracting directly with an Internet service provider (ISP) based in the municipality of Itupiranga. This provider establishes a radio connection using a tower located approximately 5 km from the community. This provider has set up two access points: one at the Basic Indigenous Health Unit, with a speed of 7 megabytes; the other at a family home, with a speed of 10 megabytes. It is important to mention that the access point at the Basic Indigenous Health Unit was implemented thirteen months ago, while the access point at the family home has only been in operation for a month. Maintenance is handled solely by the ISP.

Figure 5: Access point in the Health Unit

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C Internet access promoting digital
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Source: The authors.

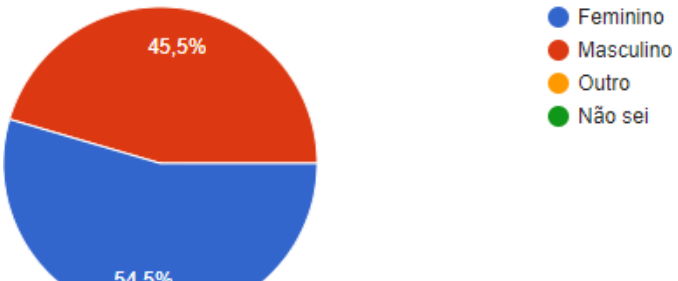
3.2 About the Respondents

The initial questions in the second questionnaire covered the respondents demographics including age, gender, and education, and were designed to better understand who the respondents were. A total of 22 responses were obtained. Ages ranged from 14 to 71 (Figure 7), 54.5% of respondents identified as women and 45.5% identified as men (Figure 8).

Figure 8: Age range of respondents.

Source: The authors.

Figure 9: Gender of respondents.



Source: The authors.

When asked about their level of education, 4.5% identified as illiterate, 4.5% stated having complete or incomplete Elementary I education (1st to 4th grade), 27.3% stated having complete or incomplete Elementary II education (5th to 8th grade), 31.8% stated having complete or incomplete high school education, and 22.7% declared having complete or incomplete higher education. None of the respondents had complete or incomplete postgraduate studies, and 9.1% knew how to read and write, but had not attended school (Figure 9.)

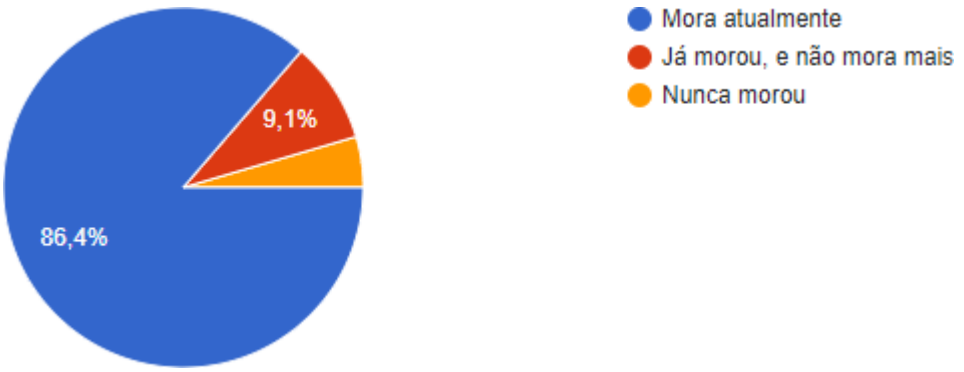
Figure 10: Education level.

Source: The authors.

3.3 Internet Utilization

To better understand the ties between the respondents and the village, the questionnaire asked them how long they had lived there. Of the total of 22 respondents, 86.4% stated they resided in the community, 9.1% were former residents, and 4.5% had never lived there (Figure 10).

Figure 11: Respondents residence in the community.

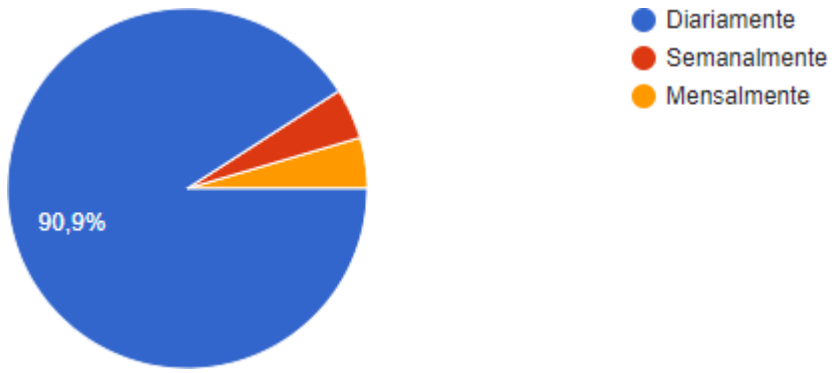


Source: The authors.

When asked about how often they used the internet, only 9% stated that they did not

use the internet daily, compared to 90.9% who used it every day (Figure 11).

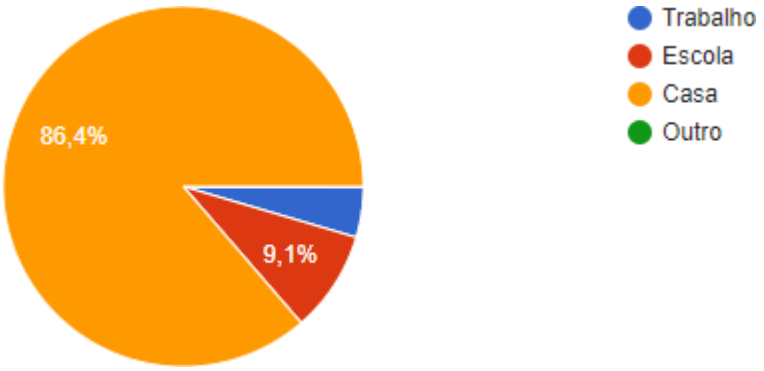
Figure 12: Frequency of Internet utilization.



Source: The authors.

Of those who used the Internet in the community, 86.4% declared that the place where they used it most was in their own homes, compared to 9.1% who were more active online at school and 4.5% at work (Figure 12).

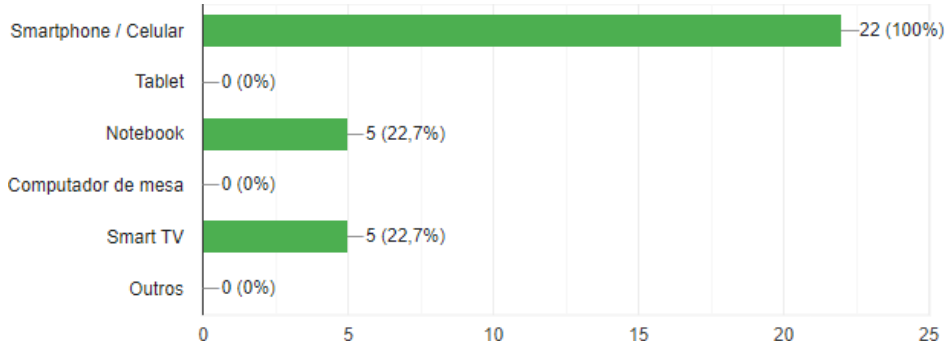
Figure 13: Place where the internet is used the most in the community.



Source: The authors.

When asked about how they connected to the Internet, answers suggested that there are only three types of devices in the community: smartphones, notebook computers, and smart TVs. Of the 22 respondents, 100% stated that they accessed the Internet using a cell phone. A total of 22.7% stated that they accessed the Internet using a notebook computer, while 22.7% declared that they access the Internet through a smart TV (Figure 13).

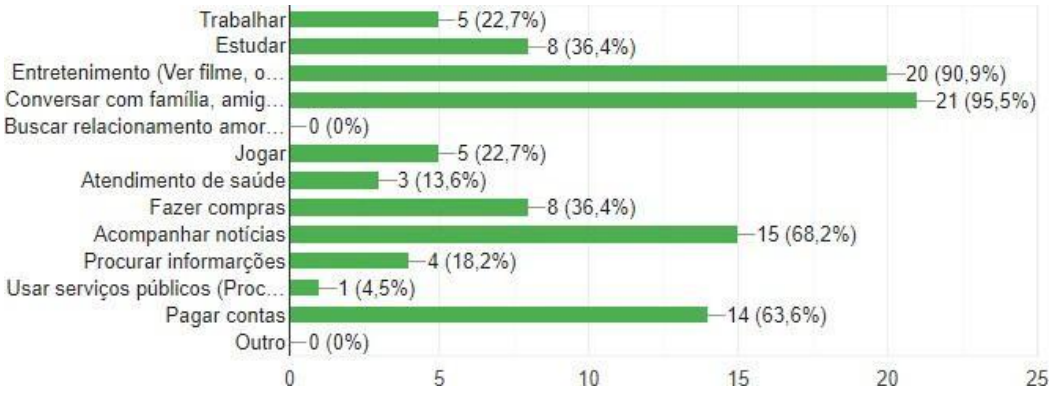
Figure 14: Devices available for connecting to the Internet.



Source: The authors.

As for why they accessed the Internet, certain purposes stand out, such as “Talking with family members, friends, etc.” which was selected by 95.5% of users, as well as “Entertainment,” mentioned by 90.9% of users. These were followed by “Keeping up with the news” (68.2%) and “Paying Bills” (63.6%).

Figure 15: Uses of the Internet in the community.



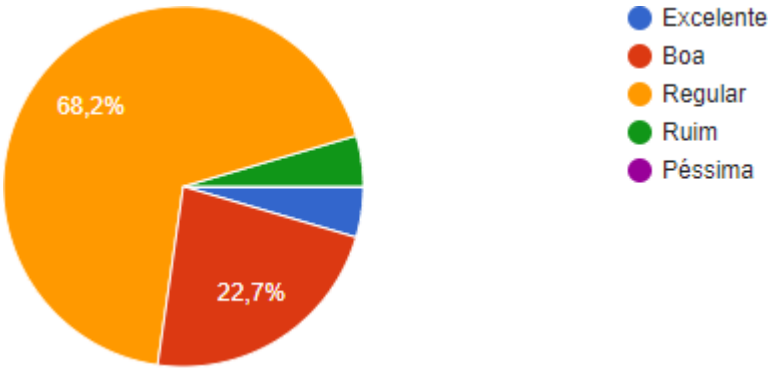
Source: The authors.

3.4 Quality of Access

In this section of the survey, participants evaluated the quality of the Internet available in the community and answered questions about common issues and their impact on daily life.

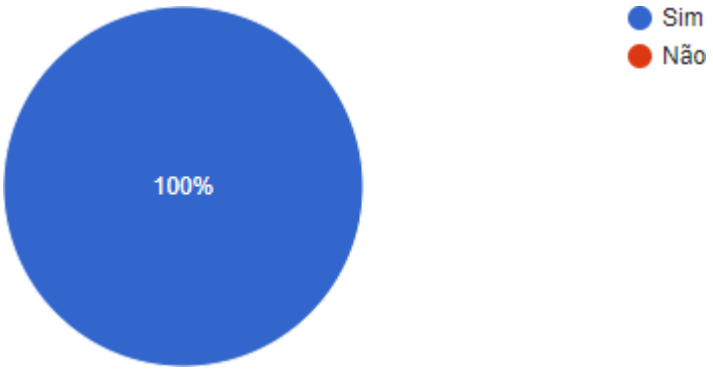
The majority (68.2%) of respondents rated the connection quality as average (Figure 16) and 100% of those who completed the survey declared that they experienced frequent issues with the network or external factors that affect it (Figure 17).

Figure 16: Internet connection quality rating.



Source: The authors.

Figure 17: Do you experience recurring problems with the connection?



Source: The authors.

When asked to characterize these problems, many respondents mentioned power outages and cloudy/rainy weather that caused connection losses or slowdowns. The most frequently mentioned effects of this included the impossibility or difficulty of communicating with family and friends, using applications, paying bills, and consuming entertainment.

When participants were asked to suggest improvements to help mitigate the effects of connection losses or slowdowns, the most common answers were increasing Internet speed and upgrading tower infrastructure.

4. Final Considerations

The primary data obtained at Guajanaíra village reveals an illusory connectivity, where its apparent presence contrasts with the insufficient quality of the infrastructure. Difficulties such as power outages and adverse weather significantly impact the community's digital experience, compromising their communication and access to online services. Results underscore the urgency of investments in technology and infrastructure, particularly the need to increase Internet speed and to upgrade the towers. More broadly, they highlight the importance of effective, accessible, and inclusive connectivity for vulnerable communities, which demands the development of public policies for digital inclusion to guarantee an equitable digital transformation.

Acknowledgments

We would like to thank the community for taking the time to help us. We would also like to thank LACNIC for their support and trust, as well as our mentor Raquel Gatto for her support and guidance.

5. References

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Programa Wi-Fi Brasil. Ministério das Comunicações (MCom). 2022. Available at: < https://www.gov.br/mcom/pt-br/acesso-a-informacao/acoes-e-programas/programas-projetos-acoes-obras-e-atividades/wi-fi-brasil >

Annex 1: Questionnaire about the Network

1. **Which Internet provider(s) offer Internet connectivity to the community?**

2. **How long has the network been implemented?**

3. **What are the main types of connections between the network and the provider?**
   a- Dial-up connection, which occupies the telephone line while in use
   b- ADSL connection utilizing the telephone line without occupying it while in use
   c- Fiber optics connection
   d- Fiber optics connection
   e- Fiber optics connection
   f- Satellite connection
   g- Mobile connection via modem or 3G or 4G chip
   h- Doesn't know

4. **Thinking about the Internet service offered within the community, would you say that:**
   a- The network offers its users different packages with different connection speeds
   b- The network offers the same package with the same connection speed to all its users
   c- Doesn't know

5. **What Internet link speeds are currently contracted or purchased by the community?**
   a- 256 kbit/s to 2 Mbit/s
   b- 2 Mbit/s to 10 Mbit/s
   c- 10 Mbit/s to 30 Mbit/s
   d- 30 Mbit/s to 100 Mbit/s
   e- 100 Mbit/s to 500 Mbit/s
   f- Other

6. **How many access points are currently installed in the community?**

7. **Does anyone in the Guajajara community maintain the network?**
   a- No, maintenance is done exclusively by the internet provider.
   b- Yes, there are people in the community who are trained and perform maintenance tasks.

Annex 2: Questionnaire for the Community

1. **What is your full name?**

2. **How old are you?**

3. **What is your gender?**
   a- Female
   b- Male
   c- Other
   d- I don't know

4. **What is the highest level of education you have attended or are currently attending?**
   a- Illiterate
   b- Knows how to read and write, but did not attend school
   c- Incomplete / Complete 1st to 4th grade/ Elementary I / Primary / 1st to 5th grade
   d- Incomplete / Complete 5th to 8th grade/ Elementary II / Gymnasium / 6th to 9th grade
   e- Incomplete / Complete 1st, 2nd, and 3rd year secondary school
   f- Incomplete/ Complete higher education
   g- Post graduate education

5. **Do you currently live or have you previously lived in the community?**
   a- I currently live in the community
   b- I used to live in the community, but no longer do
   c- I never lived in the community

6. **How often do you use the Internet?**
   a- Daily
   b- Weekly
   c- Monthly

Where do you use the community network the most?
   a- At work
   b- At school
   c- At home
   d- Other

Select the devices you use to access the internet:
   a- Smartphone / Cell phone
   b- Tablet

c- Notebook computer
d- Desktop computer
e- Smart TV
f- Other

What do you use the Internet for? (Select as many options as you wish)

a- Working
b- Studying
c- Entertainment (watching movies, listening to music, etc.)
d- Chatting with family members, friends, etc.
e- Looking for a romantic relationship or friends
f- Gaming
g- Healthcare
h- Shopping
i- Keeping up with the news
j- Searching for information
k- Using public services (consumer protection, police department, fire department, reporting, filing complaints)
l- Paying bills
m- Other

How would you rate the quality of the community network's connection in terms of speed and stability?

a- Excellent
b- Good
c- Average
d- Bad
e- Very bad

Do you experience frequent problems such as interruptions or slowdowns when using the community network?

a- Yes
b- No

If you replied “Yes” to the previous question, please briefly describe the main problems you experience.

What improvements do you suggest for improving the quality of the Community Network? Are there any additional comments or suggestions you would like to share?